Asian Review of Accounting

The effects of industry expertise on cost of debt: an individual auditor-level analysis

Ying-Chieh Wang, Hua Wei Huang, Jeng-Ren Chiou, Yu Chieh Huang,

The effects of industry expertise on cost of debt: an individual auditor-level analysis

1. Introduction

In recent years industry specialization has become a growing trend in the audit market. Industry specialists have been shown to have higher reputation and invest more resources in factors such as staff recruitment and training, information technology, and audit technology, than non-industry specialists, and thus they are able to better understand the characteristics and accounting principles in their focal industries (Dopuch and Simunic, 1982). Extant studies show that an audit firm's industry expertise will affect the degree of trust that investors have in the financial statements they produce (Craswell et al., 1995; Beasley and Petroni, 2001). Krishnan (2003) pointed out that audit firm industry experts have more experience in specific industries, and thus they are more familiar with an industry's characteristics, mode of transactions and economic outlook than non-industry experts. In addition, industry specialization makes the implementation of audit services more efficient, and it easier to detect earnings management behavior. Industry specialization can thus enhance a company's audit quality.

Extending such research into debt markets, Mansi et al. (2004) and Pittman and Fortin (2004) both noted that borrowing rates and audit firm scale have a negative relationship, and thus clients of the Big 6[1] audit firms can enjoy lower interest rates than those of smaller audit firms. Balsam et al. (2003) and Krishnan (2003) also stated that the use of Big 6 audit firms can strengthen the credibility of the resulting financial statements, and thus the clients of such firms should be offered lower interest costs. Francis et al. (2004, 2005a) also found that, due to the higher degree of industry specialization in large audit firms, they are more likely to provide high quality audit services and improve the earnings quality of their clients, which also reduces the cost of external financing.

Because of the differences in the audit regulations and legal norms in various countries, most previous studies on the association between industry expertise and audit quality provide evidence of industry expertise at the audit firm level (Palmrose, 1986;

Balsam et al., 2003; Krishnan, 2003). In most western countries, only the name of the audit firm is reported in a company's audit reports. However, in Taiwan, audit reports are produced and certified with the names of two signing auditors, in addition to a signature from a representative of the audit firm. This study thus utilizes data of audit partners in Taiwan to further explore the association between industry specialization and cost of debt at the individual auditor level[2].

Using data from the Taiwan Economic Journal (TEJ) database, our results show that industry specialist reduces the cost of debt at both the audit firm and individual auditor levels. Our evidence indicates that the clients of industry specialist auditors are more likely to enjoy a lower cost of debt than those of non-industry specialist auditors. That is, industry expertise and non-industry expertise have different effects in the debt market.

The contribution of this paper is that it provides evidence to address some gaps in the literature. First, Li et al. (2010) noted that firm level industry specialization is more likely to enhance audit quality than non-industry specialization, and it was also noted that the firms audited by specialists can enjoy a lower cost of debt. In addition, the SEC notes that the issue of reputation is different with regard to audit firms and individual auditors, because the former have more power to resist a client's aggressive accounting treatment and the latter may face more risk of audit failure and reputational damage (Chin and Chi, 2009). We thus extend the research of Li et al. (2010) and find that the clients of individual auditor industry specialists also have a lower cost of debt. Based on this evidence, we suggest that firms should hire industry specialists at the individual auditor level. Auditing specialization can not only improve the reliability of financial information, but can also reduce clients' borrowing costs. We also believe our evidence on the effects of industry expertise at the individual auditor level may have policy implications for regulators and public investors. Finally, in contrast to works carried out in the US market, we provide empirical evidence for the relation between industry specialization and cost of debt in an Asian market. In this study, we focus on Taiwanese firms because of data availability and the accuracy of information on individual auditors in this context. Moreover, the accounting regulations and economic environment in Taiwan are relatively close to those in the US. We thus believe that our results can be informative to international regulators and researchers. In particular, we also extend the findings of Chi and Chin (2011) and show the impact of audit quality on the cost of debt. Chi and Chin (2011) used discretionary

accruals and issuing a modified audit opinion as the proxies of audit quality, and found that industry specialization at the individual auditor level provides better audit quality. We also demonstrate that greater industry specialization will reduce the cost of debt.

The remainder of this paper is organized as follows. Section 2 reviews the literature on audit quality and the relationship between industry specialization and cost of debt, as well as presenting the hypotheses examined in this work. Section 3 presents the research design, data collection methods, and variable measurements. Section 4 reports the empirical results. Section 5 presents some additional analysis, and finally ends with a summary of this work and the conclusions.

2. Literature Review and Hypothesis Development

As noted above, Chin and Chi (2009) reported that the issue of reputation is different with regard to audit firms and individual auditors, because the former have more power to resist a client's aggressive accounting treatment, and the latter may face more risk of audit failure and reputational damage. Although professional audit firms in general have more resources and information, some personal knowledge is difficult to be share within companies (Carcello and Nagy, 2004; Vera-Munoz et al., 2006; Chin and Chi, 2009). Chin and Chi (2009) thus suggested that industry specialization at the individual auditor level has a more critical and direct effect on audit quality than specialization at the audit firm level.

Individual auditors with industry specialization can improve both audit quality (e.g., better earnings quality and being less likely to report misstatements) and disclosure quality (e.g., more detailed accounting information and being less likely to have omissions), as supported by prior research. For example, Dunn and Mayhew (2004) suggested that industry specialists tend to require their clients to maintain higher disclosure levels. Balsam et al. (2003) and Cano-Rodríguez et al. (2015) suggested that high quality auditors provide higher audit and disclosure quality to maintain their reputations, and that their clients also benefit from this. Aobdia et al. (2015), Kim et al. (2011) and Huguet and Gandia (2014) suggested that investors believe that the quality of disclosure is greater if firms are audited by a high quality auditor.

Australia, China, and Sweden also require firms to disclose the identities of individual

auditors. Zemi (2012) used a sample from Sweden and discussed the relation between audit fees and the industry specialization of individual auditors, and suggested that industry specialist auditors have the more specialized knowledge and experience, provide their clients with more in-depth and higher quality audits, and thus command fee premiums.

Chen et al. (2010) investigated audit quality at both the individual auditor and audit firm levels in China, and found that the audit quality of individual auditors is more affected by client importance than that of audit firms.

Ferguson and Matolcsy (2004) used Australian firms and investigated the relation between auditor quality and post-earnings announcement drift. They suggested that the disclosure of an individual auditor's name is associated with higher audit quality, less uncertainty of earnings information, and lower post-earnings announcement drift.

The major factors affecting audit quality depend on the independence and expertise (such as professional judgment and industry knowledge) of the partners involved in the audit process. When individual partners are experts with regard to a particular industry, they can improve the audit effectiveness, reduce earnings management, and improve the quality of the resulting audit report (Bonner and Lewis, 1990; Solomon et al., 1999; Beasley et al., 2000; Balsam et al., 2003; Krishnan, 2003).

There has recently been an increasing amount of research on the impact of individual auditor level industry expertise on audit quality. Sue and Chin (2007) used Taiwanese data to examine the association between firm-level industry expertise and individual-level industry expertise. Their results showed that clients of industry experts at both the audit firm and individual auditor levels have higher audit quality. Chi and Chin (2011) also used Taiwanese data to examine the relation between audit quality at both firm and individual auditor levels. Their results demonstrated that clients who hire industry experts have lower absolute discretionary accruals.

Moreover, industry specialization leads to better audit quality, which in turn reduces the cost of debt. For example, Karjalainen (2011) investigated the value relevance of audit quality in Finnish firms, and found that the outcomes of an audit are important and value relevant to lenders. Likewise, Cano-Rodríguez et al. (2015) investigated Spanish firms and suggested that clients of high quality auditors benefit from the auditor's reputation, because a high quality auditor provides greater value relevance, with less manipulation of the

financial reports they produce. A higher quality audit report can thus reduce interest rates and the cost of debt.

Moreover, industry specialization is usually associated with better auditor reputation, which may also decrease cost of debt. Aobdia et al. (2015) discussed whether the disclosure of individual auditors' name provides informational value to capital market participants, and suggested that good individual auditors provide better quality financial information and thus increase market confidence and trust. In addition, the results of Balsam et al. (2003) and Reichelt and Wang (2010) showed that auditor industry specialists provide financial reports with higher earnings quality for interested parties. Kim et al. (2011) and Huguet and Gandia (2014) also found that lenders are more likely to believe audited financial reports, and that the cost of debt in audited firms is lower than that in non-audited firms is higher.

Overall, the extant literature shows that audit quality is more likely to be improved if a partner has a high degree of industry specialization, and we conjecture that this will in turn reduce the cost of debt. In this study, we examine the association between individual auditor level industry expertise and cost of debt, using Taiwanese audit partner data. Therefore, the following hypothesis is proposed:

Hypothesis: Companies with individual-level auditor industry specialists are associated with a lower cost of debt.

3. Methodology

3.1 Model and Variables Measurement

Francis et al. (2005b) suggest that the cost of debt capital is the interest rate on the firm's debt, so this study uses interest expense and interest capitalized for the year divided by total debt to calculate the cost of debt (COD) and to assess a firm's financial situation and risk. This study uses publically available information from all Taiwanese listed and OTC companies, excluding those in the financial, securities, and banking industries, as well as new companies that have been established for less than four years, and those with no more than three years of public information.

Prior research has used various methods to measure industry specialization, such as

the market share of auditors in terms of client sales, client assets, audit fees, or number of industry clients (Dopuch and Simunic, 1982; Palmrose, 1986; Craswell et al., 1995; Balsam et al., 2003; Dunn and Mayhew, 2004). Since different measures result in different rankings of auditor expertise (Krishnan, 2001), this study adopts all the three different methods to measure industry specialization. First, as in prior studies (Chung and Kallapur, 2003; Lim and Tan, 2008; Li et al., 2010), we use the proportion of the total sales revenue earned by CPA1 in a particular industry relative to the total sales revenue earned in the same industry for Individual Level (DIFF_PI_1). An individual auditor is defined as having industry specialization if his market share in an industry is ranked number one. Second, we define industry specialization for the Firm/Individual Level via an audit firm's industry market share in terms of number of clients (DIFF_PI_2). Third, we use the audit firm's industry market share in terms of client assets to define Individual Level industry specialization (DIFF_PI_3). These last two methods of industry specialization are calculated in the same way as the first method, but they are based on the number of clients or client assets in each industry.

Based on the prior literature, we include the following control variables in our model (Modigliani and Miller, 1958; Kaplan and Urwitz, 1979; Diamond, 1984; Sengupta, 1998; Ahmed et al., 2002; Campbell and Taksler, 2003; Shi, 2003; Li et al., 2010; Jiang, 2008; Mansi et al., 2004). First, Mansi et al. (2004) suggested that short-tenure auditors have a higher cost of debt if the insurance effect of audits is valued by investors. We thus control and define TENURE as the number years the firm has employed the incumbent auditor.

Li et al. (2010) suggested that the default-risk will increase the cost of debt, and there is positive association between default-risk and cost of debt. We thus use the default-risk model of Ohlson (1980) to define O_SCORE. Additionally, following Mansi et al. (2004) and Li et al. (2010), we employ SIZE, LEVERAGE, and PROFITABILITY to control the risk that may not be captured by O_SCORE, and also consider FIRMAGE. SIZE is measured as the natural log of the total assets of the company, because firms with greater size are more likely to have a higher industry position, which helps them to obtain a lower cost of debt. LEVERAGE is a long-term liability scaled by total assets, because firms' risk will increase as leverage increases (Modigliani and Miller, 1958). PROFITABILITY is measured as operating income after depreciation divided by total assets. When the firm's profitability is better, firm value is greater and the cost of debt will be lower. FIRMAGE is

the number of years since the firm's initial public offering.

In addition, prior research finds that firms with better performance and less risk have a lower cost of debt (Ahmed et al., 2002; Campbell and Taksler, 2003; Kaplan and Urwitz, 1979; Sengupta, 1998; Shi, 2003), so we use CFO to measure this, which is measured as operating cash flows divided by total assets.

We also consider some control variables due to risk. StdROA is measured as the standard deviation of ROA calculated using five years of data, from year t-4 to t, and used to control the firm risk. When firms have higher StdROA they are more likely to have a higher non-system risk. TIMES is measured as the natural log of (1 + times-to-interests-earned ratio). Firms with a higher times-to-interests-earned ratio are more likely to have a lower default risk. RND is measured as R&D expenses divided by total assets. When a company has higher R&D expenditures it is more likely to have a high default risk. StdRET is measured as the standard deviation of a firm's daily stock returns during year t. Similar to the indicator of StdROA, the standard deviation is represented as stock price volatility. So when a company has a higher StdRET, it is more likely to have higher risk. BM is measured as the natural log of the book value of equity divided by the market value of equity. When a company has a lower book-to-market ratio, it is more likely to have a high default risk.

Finally, as Ashbaugh-Skaife et al. (2006) pointed out, ownership structure plays an important role in wealth transfers between creditors and stockholders, and the independence of the board and the power of management will affect audit quality and cost of debt. Seat_D is the ratio of seats held by independent directors in one company, while Seat_S is the ratio of independent supervisors the ratio of seats held by independent supervisors in one company. HOLD_M is the ownership ratio of the manager in a company, and DUALITY is the number of directors who are also among the firm's managers. We also consider BANKDEBT, which is 1 if the firm has notes payable or 0 if it has none, because bank debt provides external monitoring (Diamond, 1984; Li et al., 2010).

The data mainly comes from the audit quality module in the Taiwan Economic Journal (TEJ). The financial information is obtained from the TEJ financial database, which excludes firms from the financial industry and has less missing financial data. Our

sample is composed of Taiwanese listed and OTC firms during the period from 2001 to 2010.

3.2 Research Model

We construct the OLS regression model based on Mansi et al. (2004), and add the key variables in the hypotheses to test the associations between cost of debt and industry specialist at individual auditor level. In addition, we also control all industry and yearly effects in the model.

Model at the individual auditor level:

$$\begin{aligned} COD_t = {} & \beta_0 + \beta_1 * DIFF\_PI_{t-1} + \beta_2 * TENURE_{t-1} + \beta_3 * BANKDEBT_{t-1} + \beta_4 * FIRMAGE_{t-1} \\ & \beta_5 * O\_SCORE_{t-1} + \beta_6 * SIZE_{t-1} + \beta_7 * LEVERAGE_{t-1} + \beta_8 * PROFITABILITY_{t-1} \\ & + \beta_9 * CFO_{t-1} + \beta_{10} * StdROA_{t-1} + \beta_{11} * TIME_{t-1} + \beta_{12} * RND_{t-1} + \beta_{13} * StdRET_{t-1} \\ & + \beta_{14} * BM_{t-1} + \beta_{15} * SEAT\_D_{t-1} + \beta_{16} * SEAT\_S_{t-1} + \beta_{17} * HOLD\_M_{t-1} \\ & + \beta_{18} * DUALITY_{t-1} + \beta_{19} * TSE_{t-1} + \varepsilon \end{aligned} \quad \text{..... (1)}$$

COD = the cost of debt capital, which is measured as interest expense and interest capitalized for the year divided by total debt.

DIFF_PI = 1 if the industry market share of the partner is ranked one, and 0 otherwise;

TENURE = the number of years the firm has employed the incumbent auditor;

BANKDEBT = 1 if the firm has notes payable, and 0 otherwise;

FIRMAGE = the number of years since the firm's initial public offering;

O_SCORE = the Ohlson (1980) default risk measure for the firm; O-SCORE = -1.32 - 0.407 * size(the natural log of total assets) + 6.03 * (total liabilities/total assets) - 1.43 * [(current assets - current liabilities)/(total assets)] + 0.076 * (current liabilities/current assets) - 1.72 * 1 or 0 (1 if total liabilities is greater than total assets, and 0 otherwise) – 0.521 * [(current year net income - last year's net income)] / [(the absolute value of current year's net income + the absolute value of last year's net income)];

SIZE = the natural log of total assets;

LEVERAGE = total long-term debt / total assets;

PROFITABILITY = operating income after depreciation divided by total assets;

CFO = operating cash flows / total assets;

StdROA = the standard deviation of ROA calculated using five years data from

year t-4 to t. ROA is net income before extraordinary items deflated by total assets at the beginning year;

Times = the natural log of (1 + times-to-interest-earned ratio), where the times-to-interest-earned ratio is operating income before depreciation and interest expenses divided by interest expenses;

RND = R&D expenses / total assets;

StdRET = the standard deviation of a firm's daily stock returns during year t-1;

BM = the natural log of the book value of equity divided by the market value of equity;

Seat_D = the ratio of seats held by independent directors in one company

Seat_S = the ratio of seats held by independent supervisors in one company;

Hold_M = the ownership ratio of the manager in a company;

DUALITY = the number of the directors who are also among the firm's managers;

TSE = 1 if the observation is listed on the stock exchange, and 0 if it is traded over the counter.

4. Empirical Results

4.1 Sample Selection and Descriptive Statistics

Panel A in Table 1 shows the process of sample selection for the years 2001 to 2010. We exclude firms in the financial industry and missing data, and this leaves a total of 6,463 firm-year observations.

Panel B shows the data distribution of the three different methods used to measure industry specialization, which are based on client sales, number of clients, and client assets. The results for industry expertise are also presented at the individual levels.

Insert Table 1 here

Table 2 shows that for the total sample (N=6,463) the average ratio of the COD is 0.016, and the median is 0.013. The table also shows that 4.3% of the individual-level industry expertise are found for the whole sample (N=6,463) in first measurement method.

Using the second method, DIFF_2, the results show that 10.5% of the individual-level industry expertise is found for the whole sample. Finally, the third measure, DIFF_3, shows 4.1% of the individual-level industry expertise for the total sample.

Insert Table 2 here

4.2 Regression Results

Table 3 shows the empirical results of the hypothesis testing. The regression model has a high level of significance (R^2=41.75%, p<0.001; R^2=41.75%, p<0.001; R^2=41.79%, p<0.001). The results also show a weak, negative and significant relationship between industry expertise at the individual auditor level and the cost of debt of the audited companies (Coefficient=-0.001, p=0.099; Coefficient=-0.001, p=0.065; Coefficient=-0.002, p=0.008). Even though the results are weak, our results still provides some evidence to support the arguments presented in this study.

Moreover, most control variable coefficients have the same signs as in the previous studies. If the company has a violation of their contracts (O_SCORE), higher leverage (LEVERAGE), a high volatility of ROA and stock returns (StdROA and StdRET), or a higher book-to-market ratio (BM), then its cost of debt is higher than that of other firms. In contrast, if the company has a higher operating cash flow (CFO) and times-to-interests-earned ratio (TIMES), and its cost of debt is lower.

However, the coefficients of TENURE, SIZE, PROFITABILITY, and RND contradict our predictions, which may result from the differences between the sampling markets. For example, with regard to RND in the US it is reported that the greater the R&D expenses a firm has, the higher the risk of investment will be increased. However, in Taiwan the government works to increases the exports of the electronics industry, and thus it often provides support for a significant amount of R&D spending to help this industry. As a consequence, the relationship between R&D expense and the costs and risks will be reversed.

Insert Table 3 here

4.3 Additional Tests

Ashbaugh-Skaife et al. (2006) stated that credit ratings reflect an assessment of the creditworthiness of the obligor, and thus use these as a proxy of the cost of debt. This study thus also uses the TCRI[3] (Taiwan Corporate Credit Risk Index) credit ratings as proxy variables for the cost of debt, in order to test the impact of these ratings. The results show that most individual auditors with industry expertise have a negative and significant relationship with credit ratings.

We also test whether individual auditor level industry expertise can increase the quality of auditing and also lower the credit risk (both $p<0.001$) without consideration of the industry type (i.e. electronics or non-electronics). It should be remembered that this additional test is conducted in the context of Taiwan, and thus companies in the electronics industry account for 53% of the total sample. In the test, companies in the electronics industry are distinguished from those in other industries in order to avoid the industry factor affecting the results. The results are consistent with those from the main tests, and most of them are significant.

Previous studies have also shown that gender can have a significant impact on audit quality, because men and women's problem-solving abilities, risk preferences, and cognitive styles are significantly different (Lundeberg et al. 1994; Eckel and Grossman, 2002; Fellner and Maciejovsky, 2007; Gold et al., 2009; Srinidhi et al., 2011). However, Chi et al. (2010) and Hardies et al. (2010) claimed that there is not sufficient evidence to show that differences with regard to a partner's gender and experience will affect audit quality. Therefore, we also examine whether cost of debt will be affected by the partner's gender in our Taiwanese sample. The findings show there are no consistent results between audit quality and gender.

5. Conclusions

This study examines the relationship between individual auditor level industry expertise and a company's cost of debt. Our empirical results show that industry expertise at the individual auditor level is negatively related to the cost of debt. Based on the results, we suggest that one way to increase the reliability of a company's audits and to lower the cost of debt is to hire an industry specialist auditor. Otherwise, our evidence also suggests the international regulators should consider the mandatory disclosure of the names of audit partners.

However, our results should be interpreted with caution for the following reasons. First, this study is limited to Taiwanese listed and OTC companies, so we may not be able to generalize the empirical results to other countries. Second, there are potential unspecified and uncontrolled company characteristics in the analyses. For instance, differences in organizational structure and rules between countries/regions may affect the cost of debt. To address these limitations, researchers are encouraged to explore theories from other disciplines and to incorporate additional variables. Third, prior studies suggested that audit fees are a good measure of industry expertise. However, the usefulness of this measure is limited in the current context because the disclosure of audit fees is conditional in Taiwan. Further research may thus advance our understanding of the relation between audit industry expertise and cost of debt. In addition, equity capital is another important resource, and thus the cost of this should be investigated in future research.

Notes

1. The Big 6 auditors include Arthur Andersen, Coopers and Lybrand, Deloitte Touche Tohmatsu, Ernst and Young, KPMG and Price Waterhouse.
2. In this study, we use the CPA who signed first to assess industry specialization at the individual level.
3. TCRI rating is based on financial statement analysis and the concept of APL (Assets Management, Profitability, and Liquidity), developed by TEJ and measured in three steps. First, it is measured using public financial information that is classified into four categories, including profitability, security, activity, and scale. Furthermore, the financial information is transferred and APL is applied to draw the threshold levels. Finally, the forecasts of analysts, manager factors, and industry volatility are taken into consideration to adjust the final ratings.

Table 1 Sample Description

Panel A: Sample Selection Process	**2001-2010**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
Initial TSE and OTC companies in the TEJ database	25,869	3,354	2,980	2,706	2,560	2,442	2,355	2,335	2,385	2,365	2,387
Less: missing COD data	(13,598)	(2,597)	(2,109)	(1,745)	(1,562)	(1,105)	(982)	(914)	(919)	(860)	(805)
Less: missing DIFF_PI data (including finance firms)	(174)	(2)	(2)	(1)	(3)	(11)	(19)	(44)	(48)	(20)	(24)
Less: missing data of control variables	(5,634)	(497)	(539)	(550)	(504)	(689)	(660)	(500)	(501)	(566)	(628)
Final sample	6,463	258	330	410	491	637	694	877	917	919	930

Panel B: Industry Type	**N**	**DIFF_PI_1**	**DIFF_PI_2**	**DIFF_PI_3**
Cement	61	9	56	9
Foods	160	14	18	13
Plastics	202	15	16	18
Textiles	303	6	23	6
Electrical & Machinery.	343	6	17	8
Electrical Appliance & Cable	96	10	57	8
Chemical	357	14	8	10
Glass & Ceramics	37	7	15	7
Paper & Pulp	57	10	16	10
Steel & Iron	179	13	18	13

Rubber	89	9	11	9
Automobile	36	6	24	6
Electronics	3,451	113	235	113
Construction	337	6	38	6
Transportation	160	10	56	4
Tourism	38	1	4	2
Wholesale & Retail	114	10	28	9
Others	443	20	41	14
Total	6,463	279	681	265

This table reports the process of sample selection and sample distribution by industries. DIFF_PI_1＝1 if industry market share of auditors in terms of client sales is ranked one, and 0 otherwise; DIFF_PI_2＝1 if industry market share of auditors in terms of number of industry clients is ranked one, and 0 otherwise; DIFF_PI_3＝1 if industry market share of auditors in terms of client assets is ranked one, and 0 otherwise.

Table 2 Descriptive Statistics

Variables	Mean	Standard Dev.	Minimum	Median	Maximum
COD	0.016	0.013	0.000	0.013	0.191
DIFF_PI_1	0.043	0.203	0.000	0.000	1.000
DIFF_PI_2	0.105	0.307	0.000	0.000	1.000
DIFF_PI_3	0.041	0.198	0.000	0.000	1.000
Tenure	4.198	3.187	1.000	3.000	22.000
Bankdebt	0.828	0.377	0.000	1.000	1.000
FirmAge	10.361	8.559	1.000	8.000	48.000
O_score	-5.131	1.219	-9.319	-5.172	0.571
Size	15.463	1.377	11.144	15.274	20.745
Leverage	0.114	0.110	0.000	0.085	0.944
Profitability	0.013	0.101	-3.100	0.015	0.414
CFO	0.068	0.103	-0.568	0.067	1.569
StdRoa	4.443	4.847	0.007	3.088	86.535
Times	2.244	1.922	-4.861	2.116	14.328
RND	0.019	0.031	0.000	0.009	0.404
StdRet	4.037	5.648	0.064	2.872	160.863
BM	-0.179	0.661	-4.833	-0.174	2.408
Seat_D	0.117	0.157	0.000	0.000	0.667
Seat_S	0.107	0.190	0.000	0.000	1.000
Hold_M	1.781	2.813	0.000	0.620	29.860
DUALITY	1.873	1.275	0.000	2.000	10.000
TSE	0.670	0.470	0.000	1.000	1.000

N	6,463

This table reports the descriptive statistics of variables, and all continuous variables are winsorized at 1 percentile. COD＝the cost of debt capital, which is measured as interest expense and interest capitalized for the year divided by total debt; DIFF_PI_1＝1 if industry market share of auditors in terms of client sales is ranked one, and 0 otherwise; DIFF_PI_2＝1 if industry market share of auditors in terms of number of industry clients is ranked one, and 0 otherwise; DIFF_PI_3＝1 if industry market share of auditors in terms of client assets is ranked one, and 0 otherwise; TENURE＝the number of years the firm has employed the incumbent auditor; BANKDEBT＝1 if the firm has notes payable, and 0 otherwise; FIRMAGE＝the number of years since the firm's initial public offering; O_SCORE＝the Ohlson (1980) default risk measure for the firm; SIZE＝the natural log of total assets; LEVERAGE＝total long-term debt / total assets; PROFITABILITY＝operating income after depreciation divided by total assets; CFO＝operating cash flows / total assets; StdROA ＝ the standard deviation of ROA calculated using five years data from year t-4 to t. ROA is net income before extraordinary items deflated by total assets at the beginning year; Times＝the natural log of (1 + times-to-interests-earned ratio), where times-to-interests-earned ratio is operating income before depreciation and interest expense divided by interest expense; RND＝R&D expenses / total assets; StdRET＝the standard deviation of firm's daily stock returns during year t-1; BM ＝ the natural log of book value of equity divided market value of equity; Seat_D＝the ratio of seats held by independent directors in one company. Seat_S＝the ratio of seats held by independent supervisors in one company. Hold_M＝the ownership ratio of the manager in one company; DUALITY＝the number of the directors who are also among the firm's managers; TSE＝1 if observation is listed on the stock exchange, and 0 is traded over the counter.

Table 3 Cost of Debt and Auditor Expertise: Individual Auditor Level Specialist Analysis

Variable	Predicted Sign	Model A (DIFF_PI_1) Coefficient	Model A (DIFF_PI_1) p-value	Model B (DIFF_PI_2) Coefficient	Model B (DIFF_PI_2) p-value	Model C (DIFF_PI_3) Coefficient	Model C (DIFF_PI_3) p-value
Intercept		0.015	***<.0001*** ***	0.016	***<.0001*** ***	0.015	***<.0001*** ***
DIFF_PI	−	-0.001	***0.099*** *	-0.001	***0.065*** *	-0.002	***0.008*** ***
TENURE	−	0.0001	***0.010*** **	0.0001	***0.009*** ***	0.0001	***0.010*** **
BANKDEBT	−	0.0001	0.589	0.0001	0.587	0.0001	0.710
FIRMAGE	−	0.000004	0.851	0.000004	0.837	0.00001	0.732
O_SCORE	+	0.002	***<.0001*** ***	0.002	***<.0001*** ***	0.002	***<.0001*** ***
SIZE	−	0.001	***<.0001*** ***	0.001	***<.0001*** ***	0.001	***<.0001*** ***
LEVERAGE	+	0.007	***<.0001*** ***	0.007	***<.0001*** ***	0.008	***<.0001*** ***
PROFITABILITY	−	0.004	***0.026*** **	0.004	***0.020*** **	0.004	***0.027*** **
CFO	−	-0.003	***0.009*** ***	-0.004	***0.007*** ***	-0.004	***0.008*** ***
StdROA	+	0.0002	***<.0001*** ***	0.0002	***<.0001*** ***	0.0002	***<.0001*** ***
TIMES	−	-0.002	***<.0001*** ***	-0.002	***<.0001*** ***	-0.002	***<.0001*** ***
RND	+	-0.023	***<.0001*** ***	-0.023	***<.0001*** ***	-0.023	***<.0001*** ***
StdRET	+	0.0001	***<.0001*** ***	0.0001	***<.0001*** ***	0.0001	***<.0001*** ***
BM	+	0.001	***<.0001*** ***	0.001	***<.0001*** ***	0.001	***<.0001*** ***
Seat_D	?	0.001	0.388	0.001	0.422	0.001	0.341
Seat_S	?	-0.001	0.246	-0.001	0.225	-0.001	0.244
Hold_M	?	0.00003	0.470	0.00003	0.497	0.00003	0.425
DUALITY	?	0.00003	0.756	0.00001	0.855	0.00004	0.676
TSE		0.0001	0.773	0.0001	0.700	0.0001	0.846
Year/Industry		*Controlled*		*Controlled*		*Controlled*	
Adjusted R^2		41.75%		41.75%		41.79%	
F-stat.		103.91		103.94		104.08	

p-value	***<0.001*** ***	***<0.001*** ***	***<0.001*** ***
N	6,463	6,463	6,463

*, **, ***two-tailed significance at p-value<0.10, 0.05, and 0.01.

This table reports the descriptive statistics of variables, and all continuous variables are winsorized at 1 percentile. COD＝the cost of debt capital, which is measured as interest expense and interest capitalized for the year divided by total debt; DIFF_PI_1＝1 if industry market share of auditors in terms of client sales is ranked one, and 0 otherwise; DIFF_PI_2＝1 if industry market share of auditors in terms of number of industry clients is ranked one, and 0 otherwise; DIFF_PI_3＝1 if industry market share of auditors in terms of client assets is ranked one, and 0 otherwise; TENURE＝the number of years the firm has employed the incumbent auditor; BANKDEBT＝1 if the firm has notes payable, and 0 otherwise; FIRMAGE＝the number of years since the firm's initial public offering; O_SCORE＝the Ohlson (1980) default risk measure for the firm; SIZE＝the natural log of total assets; LEVERAGE＝total long-term debt / total assets; PROFITABILITY＝operating income after depreciation divided by total assets; CFO＝operating cash flows / total assets; StdROA ＝ the standard deviation of ROA calculated using five years data from year t-4 to t. ROA is net income before extraordinary items deflated by total assets at the beginning year; Times＝the natural log of (1 + times-to-interests-earned ratio), where times-to-interests-earned ratio is operating income before depreciation and interest expense divided by interest expense; RND＝R&D expenses / total assets; StdRET＝the standard deviation of firm's daily stock returns during year t-1; BM ＝ the natural log of book value of equity divided market value of equity; Seat_D＝the ratio of seats held by independent directors in one company. Seat_S＝the ratio of seats held by independent supervisors in one company. Hold_M＝the ownership ratio of the manager in one company; DUALITY＝the number of the directors who are also among the firm's managers; TSE＝1 if observation is listed on the stock exchange, and 0 is traded over the counter.

Reference

1. Ahmed, A., Billing, B., Morton, R., and Stanford-Harris, M. (2002), "The role of accounting conservatism in mitigating bondholder-shareholder conflicts over dividend policy and in reducing cost of debts", The Accounting Review, Vol. 77, pp. 867-890.

2. Aobdia, D., Lin, C. J., and Petacchi, R. (2015), "Capital market consequences of audit partner quality", The Accounting Review, Vol. 90 No. 6, pp. 2143-2176.

3. Ashbaugh-Skaife, H., Collins, D. W., and LaFond, R. (2006), "The effects of corporate governance on firms' credit ratings", Journal of Accounting and Economics, Vol. 42 No. 1-2, pp. 203-243.

4. Beasley, M. S., Carcello, J. V., Hermanson, D. R., and Lapides, P. D. (2000), "Fraudulent financial reporting: Consideration of industry traits and corporate governance mechanisms", Accounting Horizons, Vol. 14 No. 4, pp. 441-454.

5. Beasley, M. S. and Petroni, K. R. (2001), "Board independence and audit-firm type", Journal of Practice & Theory, Vol. 20 No. 1, pp. 97-114.

6. Balsam, S., Krishnan, J., and Yang, J. S. (2003), "Auditor industry specialization and earnings quality", Journal of Practice & Theory, Vol. 22 No. 2, pp. 71-97.

7. Bonner, S. E. and Lewis, B. L. (1990), "Determinants of auditor expertise", Journal of Accounting Research, Vol. 28 Studies on Judgment Issues in Accounting and Auditing, pp. 1-20.

8. Campbell, J. Y. and Taksler, G. B. (2003), "Equity volatility and corporate bond yields", The Journal of Finance, Vol. 58 No. 6, pp. 2321-2349.

9. Cano-Rodríguez, M., Alegria, S. S., and Torres, P. A. (2015), "The influence of auditor's opinion and auditor's reputation on the cost of debt: Evidence from private Spanish firms", Working paper, available at: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2677095.

10. Carcello, J. V. and Nagy, A. L. (2004), "Client size, auditor specialization, and fraudulent financial reporting", Managerial Auditing Journal, Vol. 19 No. 5, pp. 651–668.

11. Chen, S., Sun, S. Y. J., and Wu, D. (2010)," Client importance, institutional improvements, and audit quality in China: An office and individual auditor level analysis", The Accounting Review, Vol. 85 No. 1, pp. 127-158.

12. Chi, H. Y. and Chin, C. L. (2011), "Firm versus partner measures of auditor industry expertise and effects on auditor quality", Auditing: Journal of Practice & Theory, Vol. 30 No. 2, pp. 201-229.

13. Chi, W., Myers, L. A., Omer, T. C., and Xie, H. (2010), "The effects of audit partner pre-client experience on earnings quality and perceptions of earnings quality: Evidence from Taiwan", Working paper, available at: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1304953.

14. Chin, C. L. and Chi, H. Y. (2009), "Reducing restatements with increased industry expertise", Contemporary Accounting Research, Vol. 26 No. 3, pp. 729-765.

15. Chung, H. and Kallapur, S. (2003), "Client importance, nonaudit services, and abnormal accruals", The Accounting Review, Vol. 78 No. 4, pp. 931-955.

16. Craswell, A. T., Francis, J. R., and Taylor, S. L. (1995), "Auditor brand name reputations and industry specializations", Journal of Accounting and Economics, Vol. 20 No. 3, pp. 297-322.

17. Diamond, D. W. (1984), "Financial intermediation and delegated monitoring", Review of Economic Studies, Vol. 51 No. 3, pp. 393-414.

18. Dopuch, N. and Simunic, D. (1982), "Competition in auditing：An assessment", in Symposium on Auditing Research IV, University of Illinois, Urbana, pp. 401-450.

19. Dunn, K. A. and Mayhew, B. W. (2004), "Audit firm industry specialization and client disclosure quality", Review of Accounting Studies, Vol. 9 No. 1, pp. 35-58.

20. Eckel, C. K. and Grossman, P. J. (2002), "Sex differences and statistical stereotyping in attitudes toward financial risk", Evolution and Human Behavior, Vol. 23 No. 4, pp. 281-295.

21. Fellner, G. and Maciejovsky, B. (2007), "Risk attitude and market behavior: Evidence from experimental asset markets" Journal of Economic Psychology, Vol. 28 No. 3, pp. 338-350.

22. Ferguson, A. and Matolcsy, Z. (2004), “Audit quality and post earnings announcement drift”, Asia-Pacific Journal of Accounting and Economics, Vol. 11 No. 2, pp. 121-137.

23. Francis, J., LaFond, R., Olsson, P., and Schipper, K. (2004), "Costs of equity and earnings attributes", The Accounting Review, Vol. 79 No. 4, pp. 967-1010.

24. Francis, J. R., Reichelt, K., and Wang, D. (2005a), "The pricing of national and city-specific reputations for industry expertise in the U.S. audit market", The Accounting Review, Vol. 80 No. 1, pp. 113–36.

25. Francis, J. R., Khurana, I. K., and Pereira, R. (2005b), "Disclosure incentives and effects on cost of capital around the world", The Accounting Review, Vol. 80 No. 4, pp. 1125-1162.

26. Gold, A., Hunton, J., and Gomaa, M. (2009), "The impact of client and auditor gender on auditors’ judgments", Accounting Horizons, Vol. 23 No. 1, 1-18.

27. Hardies, K., Breesch, D., and Branson, J. (2010), "Are female auditors still women? Analyzing the sex differences affecting audit quality", Working paper, available at: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1409964.

28. Huguet, D. and Gandía, J. L. (2014), "Cost of debt capital and audit in Spanish SMEs", Spanish Journal of Finance and Accounting, Vo. 43 No. 3, pp. 266−289.

29. Jiang, J. (2008), "Beating earnings benchmarks and the cost of debt", The Accounting Review, Vol. 83 No. 2, pp. 377-416.

30. Karjalainen, J. (2011), "Audit quality and cost of debt capital for private firms: Evidence from Finland", International Journal of Auditing. Vol. 15 No. 1, pp. 88-108.

31. Kaplan, R. and Urwitz, G. (1979), "Statistical models of bond ratings: A methodological inquiry", Journal of Business, Vol. 52 No. 2, pp. 231-261.

32. Kim, J., Simunic, D., Stein, M., and Yi, C. (2011), "Voluntary audits and the cost of debt for privately held firms: Korean evidence", Contemporary Accounting Research, Vo. 28 No. 2, pp. 585−615.

33. Krishnan, J. (2001), "A comparison of auditor's self-reported industry expertise and alternative measures of industry specialization", Asian-Pacific Journal of Accounting and Economics, Vol. 8 No. 2, pp. 127-142.

34. Krishnan, G. V. (2003), "Does Big 6 auditor industry expertise constrain earnings management", Accounting Horizons, Vol. 17 (Supplement), pp. 1-16.

35. Li, C., Xie, Y., and Zhou, J. (2010), "National level, city level auditor industry specialization and cost of debt", Accounting Horizons, Vol. 24 No. 3, pp. 395-417.

36. Lim, C. Y. and Tan, H. T. (2008), "Non-audit service fees and audit quality: The impact of auditor specialization", Journal of Accounting Research, Vol. 46 No. 1, pp. 199-246.

37. Lundeberg, M. A., Fox, P. W., and Punchochar J. (1994), "Highly confident, but wrong: Gender differences and similarities in confidence judgment", Journal of Educational Psychology, Vol. 86 No. 1, pp. 114-121.

38. Mansi, A. S., Maxwell, W. F., and Miller, D. P. (2004), "Does auditor quality and tenure matter to investors? Evidence from the bond market", Journal of Accounting Research, Vol. 42 No. 4, pp. 755-793.

39. Modigliani, F. and Miller, M. H. (1958), "The costs of capital, corporation finance, and the theory of investment", The American Economic Review, Vol. 48 No. 3, pp. 261-297.

40. Ohlson, J. A. (1980), "Financial ratios and the probabilistic prediction of bankruptcy", Journal of Accounting Research, Vol. 18 No. 1, pp. 109-131.

41. Palmrose, Z. (1986), "Audit Fees and Auditor Size: Further Evidence", Journal of Accounting Research, Vol. 24 No. 1, pp. 97-110.

42. Pittman, J. A. and Fortin, S. (2004), "Auditor choice and the cost of debt capital for newly public firms", Journal of Accounting and Economics, Vol. 37 No. 1, pp. 113-136.

43. Reichelt, K. and Wang, D. (2010), "National and office-specific measures of auditor industry expertise and effects on audit quality", Journal of Accounting Research, Vol. 48 No. 3, pp. 647-686.

44. Sengupta, P. (1998), "Corporate disclosure quality and the cost of debt", The Accounting Review, Vol. 73 No. 4, pp. 459-474.

45. Shi, C. (2003), "On the trade-off between the future benefits and riskiness of R&D: A bondholders' perspective", Journal of Accounting and Economics, Vol. 35 No. 2, pp. 227-254.

46. Sue, S. H. and Chin, C. L. (2007), "The impact of firm level and individual level industry expertise on earnings conservatism", 2007 Annual meeting of the American Accounting Association, Chicago, Illinois.

47. Solomon, I., Shields M. D., and Whittington, O. R. (1999), "What Do Industry-Specialist Auditors Know", Journal of Accounting Research, Vol. 37 No. 1, pp. 191-208.

48. Srinidhi, B., Gul, F., and Tsui, J., (2011). "Female directors and earnings quality", Contemporary Accounting Research, Vol. 28 No. 5, pp. 1610-1644.

49. Vera-Munoz, S. C, Ho, J. L., and Chow, C. W. (2006), "Enhancing knowledge sharing in public accounting firms", Accounting Horizons, Vol. 20 No. 2, pp. 133-55.

50. Zemi, M. (2012), “Audit Partner Specialization and Audit Fees: Some Evidence from Sweden”, Contemporary Accounting Research, Vol. 29 No. 1, pp.312-340.